Office of Enterprise Assessments (EA) **Operational Awareness Record – Rev 0**	**Report Number:** EA-HANFORD-2014-09 thru 2015-06
Site: Hanford	**Subject:** EA Review of the Hanford K-West Annex Facility

Dates of Activity:	09/09/14, 12/13/14, 03/18/15, and 6/10/15	**Report Preparer:**	Joseph Lenahan

Activity Description/Purpose:

1. Observe ongoing construction activities and review the status of construction at the K-West Annex facility.
2. Review structural steel bolting and welding quality control inspection records.
3. Review concrete anchor installation procedures, a sample of quality records documenting commercial grade dedication of concrete anchors, and a sample of records documenting quality control inspections of concrete anchors.
4. Review a sample of nonconformance reports (NCRs) initiated to disposition welding and concrete anchor installation deficiencies.

Result:

1. The general contractor for the K-West Annex facility is Federal Engineers and Constructors (FE&C). FE&C uses several subcontractors on the project to install various systems such as the fire protection system, mechanical equipment, the heating, ventilation, and air conditioning (HVAC) system, and the electrical system. Due to space limitations in the K-West Annex, only one subcontractor at a time can work on the project. No construction work was observed during the September and December site visits because a subcontractor was applying fireproofing materials to the structural steel. Fumes and chemical vapors from the sprayed-on fireproofing materials restricted access to the building. During the March visit, the work observed included preparations to remove existing concrete slabs required for tank installation. Concrete and structural steel construction work for the building structure is complete. Installation of most of the mechanical and electrical equipment in the K-West Annex facility is essentially complete. Openings in facility equipment are capped to prevent internal contamination from construction work, and the equipment is covered with plastic covers and/or tarpaulins. Installation of supports and HVAC ductwork is complete. Installation of pipe supports and piping, electrical conduit, lighting, and supports is practically complete. The electrical subcontractor has started installing (pulling) electrical cables. The bridge crane has been installed in the loading bay and is covered with tarpaulins to protect the crane and its components during ongoing construction activities. EA examined the completed transfer hose system between the K-West reactor building fuel pool and the K-West Annex facility during the June site visit. This system consists of three separate hoses, one for transfer from fuel pool to the K-West Annex, the second for effluent return to the fuel pool, and the third, a spare hose. The last major component, the truck scale in the loading bay will be installed during the next phase of construction during which installation of the remaining mechanical equipment and startup testing of the facility will be completed. No deficiencies were identified during the construction observations.
2. EA reviewed records documenting inspection of installation and tensioning of structural steel bolts and structural steel welding. Welding records examined included: visual welding inspection records, weld maps, records of visual inspection and ultrasonic examination of demand critical welds, certified material test reports for weld filler materials used in demand critical welds, and welding process specifications for demand critical welds. Note: Demand critical welds are those welds in a structure that the structural engineer has determined are required to develop a seismic-load resisting system and withstand significant inelastic deformations when subjected to seismic design level forces. Failure of a demand critical weld has the potential to result in the catastrophic failure of the structure. The demand critical welds are designated on the K-West Annex facility construction drawings. These welds are complete joint penetration welds. EA determined for the sample reviewed that quality control inspections for structural steel bolting and welding were performed in accordance with specification requirements.
3. EA reviewed a sample of quality records associated with post installed concrete anchors. These records included the manufacturer's installation instructions and commercial grade dedication inspection reports for the three types of concrete anchors specified in the design documents (undercut anchors, expansion anchors, and adhesive anchors), including the adhesive. EA also reviewed a sample of concrete anchor installation inspection reports prepared by the contractor's independent testing laboratory. EA determined for the sample reviewed that installation and inspection of post installed concrete anchors were performed in accordance with specification requirements.

4. EA reviewed the contractor's NCR report log. EA also performed a detailed review of two closed NCRs initiated to disposition structural steel welding deficiencies and two closed NCRs initiated to disposition post installed concrete anchor deficiencies. The corrective actions were appropriate to disposition the problems identified in the NCRs reviewed by EA.

   EA concluded that construction quality at the K-West Annex facility was adequate in the areas reviewed. No deficiencies were identified in the areas reviewed

EA Participants	**References (Key Documents, Interviews, and Observations)**
1. Robert E. Farrell	1. Special Inspection Daily Reports for inspection of anchor bolt inspection installations, number R-14-1474, dated September 24, 2014, number R-14- 1491, dated October 7, 2014, number R-15-0013, dated January 15, 2015
2. Joseph J. Lenahan	2. Installation instructions and product data for Hilti undercut anchors and Hilti KWIK expansion anchors.
	3. Intermech Nonconformance Report NCR-14-03, Hilti Undercut M10 Anchor Bolts.
	4. FE&C Nonconformance Report NCR-2014-008, Welding Surface for Beam Pocket.
	5. FE&C Nonconformance Report NCR-2013-014, Failure of a Stud Weld on an Embed Plate.
	6. FE&C Nonconformance Report NCR-15-0005, Anchors Failed to Secure at Required Depth.
	7. Commercial Grade Inspection Plan IP 2014-05, Hilti HIT-HY-200 Adhesive CGID-008
	8. CGID IP 2014-03, 5/8" Hilti HAS Adhesive Anchor CGID-019.
	9. CGID IP 2014-04 HAD-P m20-50/100 Undercut Anchor Exhaust Stack, CGID-01.
	10. Welding Procedure Specification AIE2013-1 for Demand Critical Welds.
	11. Certified Material Test Report for E71T Weld Filler Material for Lot Number 135789988.
	12. Weld Examination and Test Records.
	13. Weld Maps E-24-1 and E-91.
	14. AWS Ultrasonic Reports for Weld Numbers A-644 through A-649 and Weld Numbers A-650 through A-654.

Were there any items for EA follow up? ☐Yes ☒No

EA Follow Up Items	

None.